

OPERATING SUMMARY

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TOWN OF

ESPANOLA

WATER POLLUTION CONTROL PLANT and
WATER SUPPLY SYSTEM

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ESPANOLA
WATER POLLUTION CONTROL PLANT

and
WATER SUPPLY SYSTEM

operated for
THE TOWN OF ESPANOLA

by
MINISTRY OF THE ENVIRONMENT

1974 ANNUAL OPERATING SUMMARY

prepared by
Plant Performance Unit
TECHNICAL SERVICES BRANCH

T. Cross, Director

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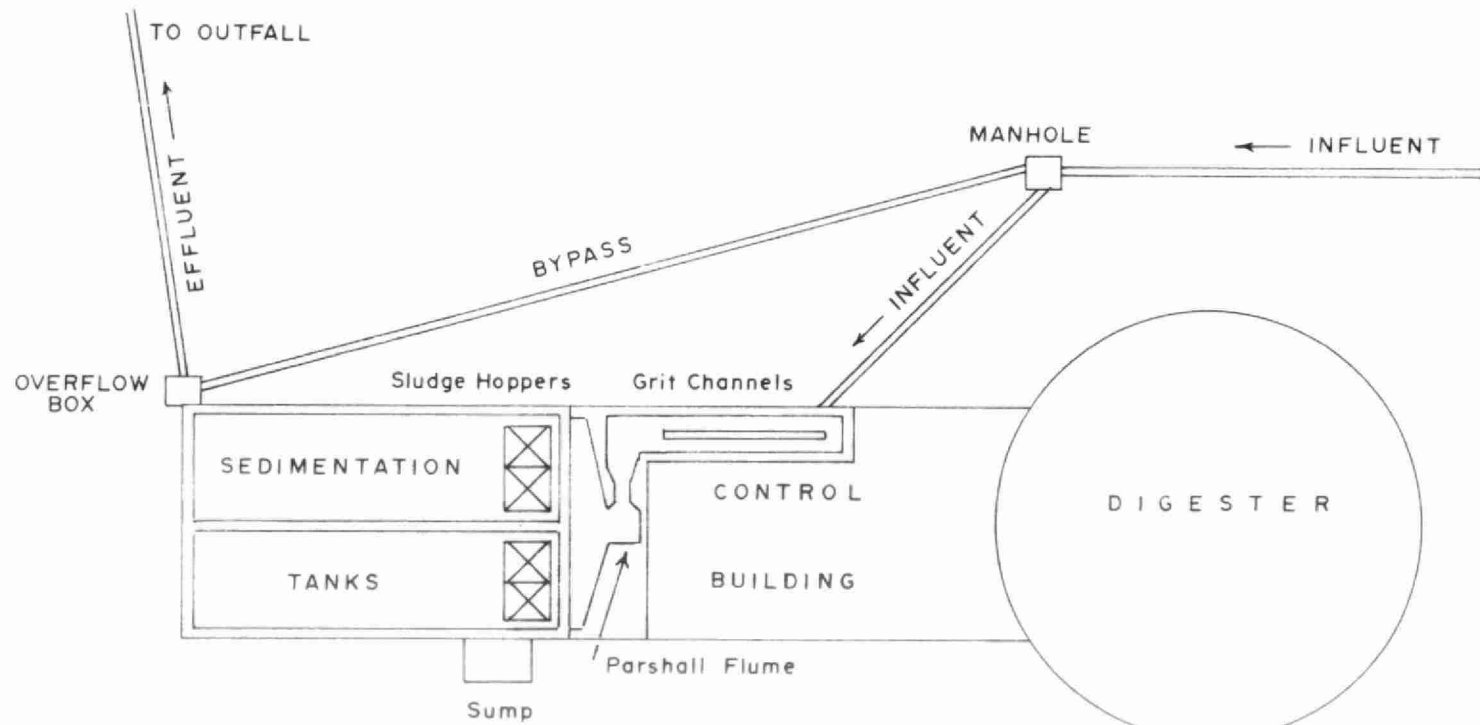
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WATER POLLUTION CONTROL PLANT

TOWN OF
ESPANOLA
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NAME	Town of Espanola WPCP
PROJECT NO.	2-0074-61 <u>SCREENING</u>
TREATMENT	Primary 2 manually cleaned bar screens
DESIGN FLOW	0.66 mgd <u>GRIT REMOVAL</u>

Two channels - 14'6" x 1.5' x 1.07'
(liq. depth)
Flow Velocity - 1.0 fps

PRIMARY SEDIMENTATION

Size: Two 36' x 12' x 10'
Volume: 8640 ft³ or 54,000 gal.
Detention: 1.95 hours
Loading: Surface 773 gpd/ft²

OUTFALL

Spanish River

SLUDGE DISPOSAL

Single stage digestion, fixed roof
Size: One 35' dia. x 19.4' swd
Volume: 18,700 ft³ or 116,000 gal.

'74 Review

GENERAL

The project consists of a 0.66 MGD primary treatment plant with single stage anaerobic sludge digestion.

During the year, plans and specifications were prepared for the installations of the new chlorination facilities. These facilities should be constructed some time in 1975.

A digester cleanout was performed in April and May. Most of the sludge was removed using the in-plant pumps. Compressed air was blown into the digester to keep the sludge in suspension to facilitate pumping. This procedure obviated the need for excessive dilution water to thin-out the sludge for pumping purposes.

A new three-speed pump control system designed by Field Services Section of the Technical Services Branch was installed at the Spruce Street pumping station. This new system obviated the need for the flowmatcher system.

OPERATING COSTS

The total operating cost for the sewage project was \$27,937, representing an increase of 26% over the previous year.

The average cost per million gallons of sewage treated was \$175 which is 13% greater than the 1973 cost.

Reserve fund expenditures were approved during the year for the following items:

1. Installation of chlorination facilities.
2. Two-way FM mobile radio.
3. Snowblower.

The balance in the reserve fund as of September 31, 1974 was \$45,110.21.

PLANT FLOW AND CHLORINATION

The flow meter was inoperable from January to October, and the average daily flow for the year was estimated to be 440,000 gallons.

PLANT EFFICIENCY

The raw sewage BOD and suspended solids concentration averages were 200 mg/l and 270 mg/l respectively which represents a BOD increase of 5% and a suspended solids increase of 69% from the previous year.

The final effluent BOD and suspended solids concentration averages were both 71 mg/l which is slightly lower than the concentrations achieved in 1973. The BOD removal efficiency was 65% and the suspended solids removals efficiency was 71% which represents an increased efficiency in both BOD and suspended solids removal by 21% and 42% respectively over the 1973 removal.

SLUDGE DIGESTION & DISPOSAL

A total of 788,000 gallons of raw sludge was pumped to the digester and a total of 376,000 gallons of digested sludge was removed and hauled to a disposal site during the digester cleanout in April and May.

The average total solids concentration of the raw sludge was 2.2%, of which the volatile solids contents averaged 79%. The digested sludge total solids averaged 4.3%, of which 66% was volatile matter. The solids concentration in the digested sludge hauled from the plant exceeded the minimum of 3.5% set as a target in 1973.

The volatile solids reduction was calculated to be 48.4% which is about average for primary treatment plant and, in view of this, the reduction will not have to be improved with digester mixing equipment if the plant staff continue to operate the digester with its present efficiency.

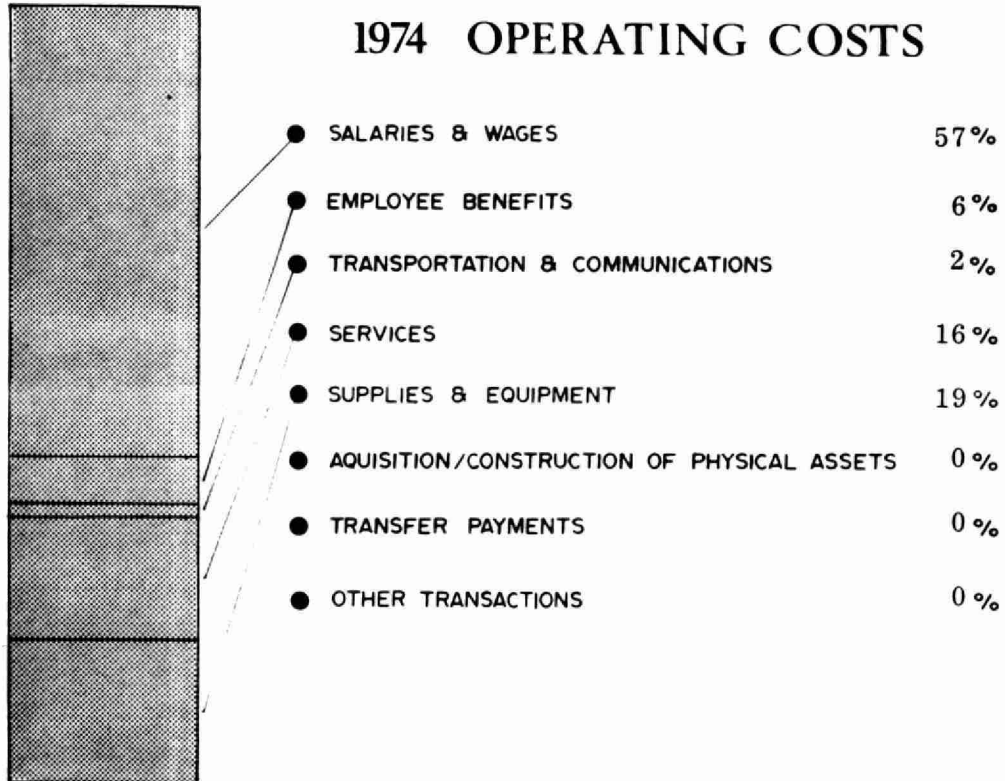
CONCLUSIONS

During the year, the plant produced very good effluent for a primary treatment process.

Chlorination facilities will be installed as soon as possible in 1975.

ANNUAL COSTS

1974 OPERATING COSTS



YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			\$/M.G.	¢/lb BOD
1972	117*	\$ 19,388	166	17
1973	146*	22,162	152	20
1974	159	40,614	255	20

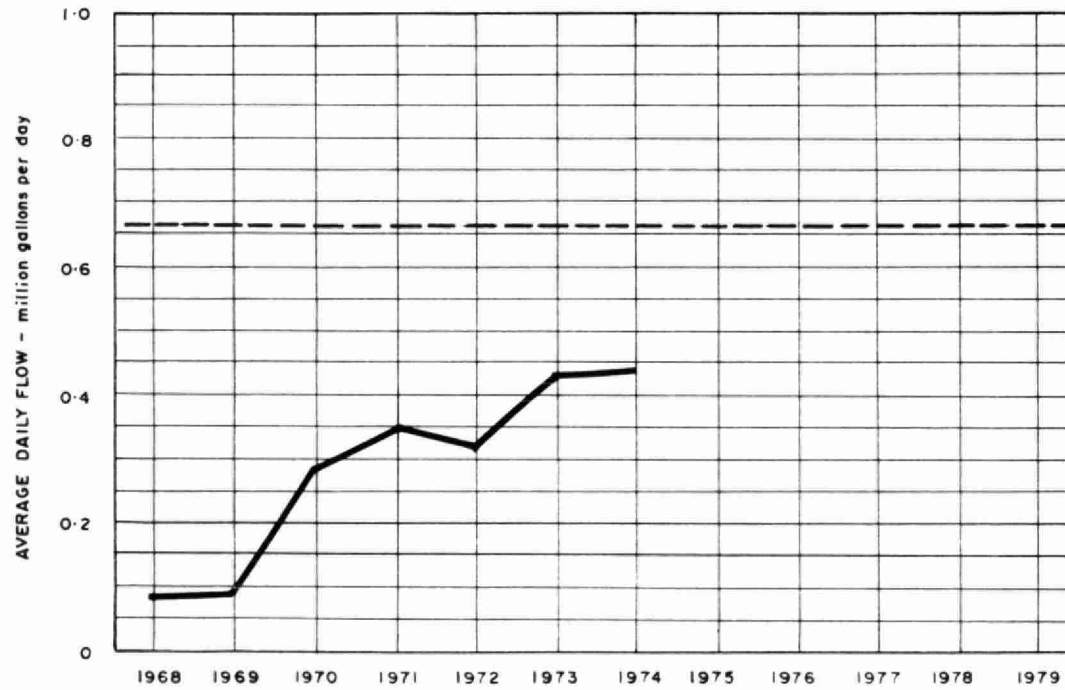
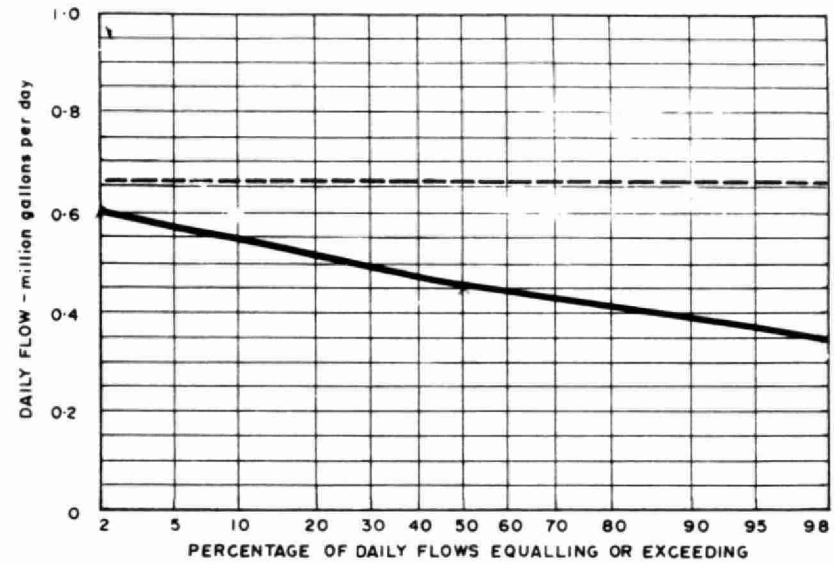
* Estimated

OPERATING EXPENDITURES

Regular Staff	\$ 22986	\$
Casual (Unclassified) Staff		
TOTAL SALARIES AND WAGES		22986
TOTAL EMPLOYEE BENEFITS		2368
TOTAL TRANSPORTATION AND COMMUNICATIONS		1004
Insurance	802	
Sludge Haulage	3689	
Repairs and Maintenance	2023	
Other Services	13	
TOTAL SERVICES		6527
Machinery and Equipment	2473	
Chemicals	240	
Utilities	3206	
Other Supplies and Equipment	1810	
TOTAL SUPPLIES AND EQUIPMENT		7729
TOTAL AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS		
TOTAL TRANSFER PAYMENTS		
OTHER TRANSACTIONS		
GRAND TOTAL	GRAND TOTAL	\$ 40614

PROCESS DATA

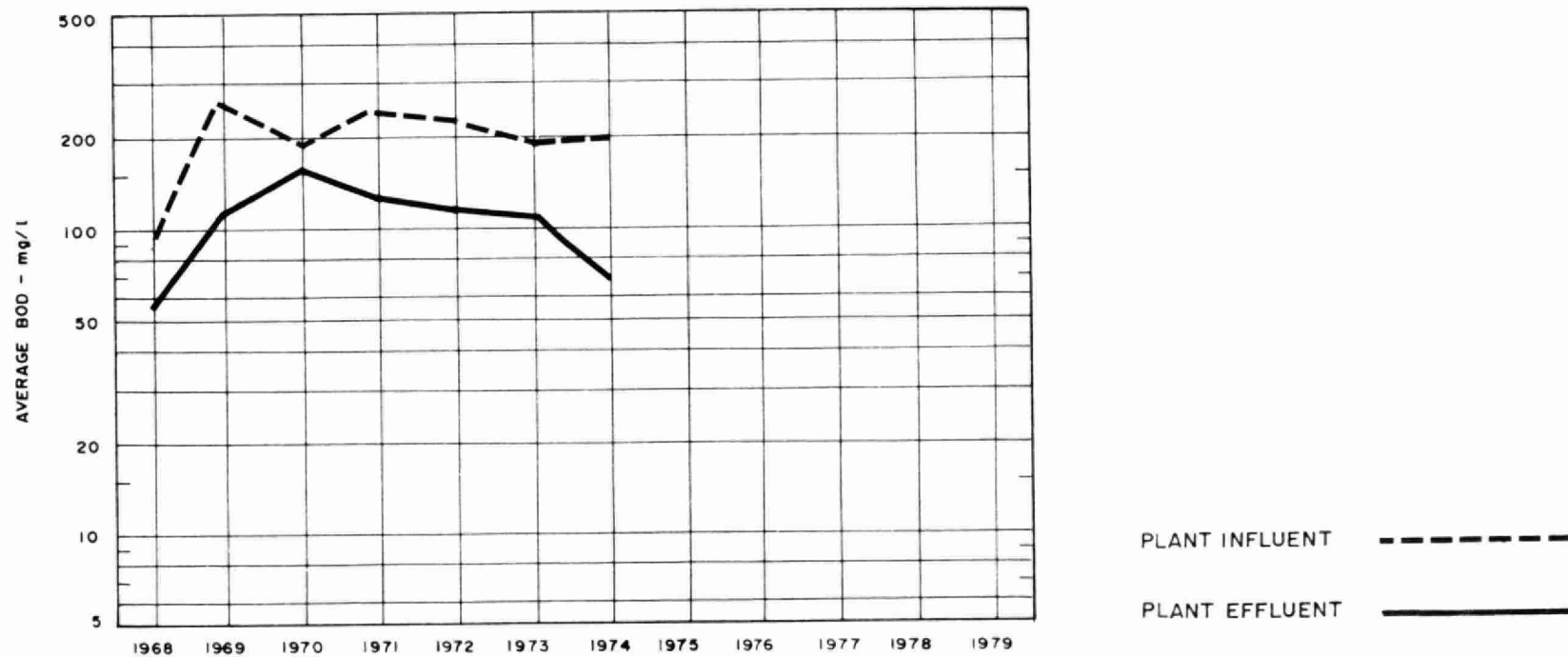
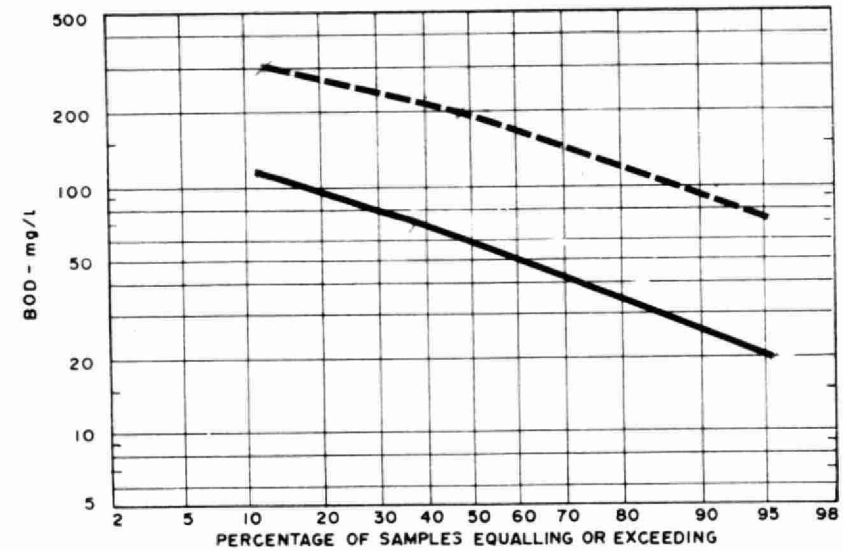
FLOWS



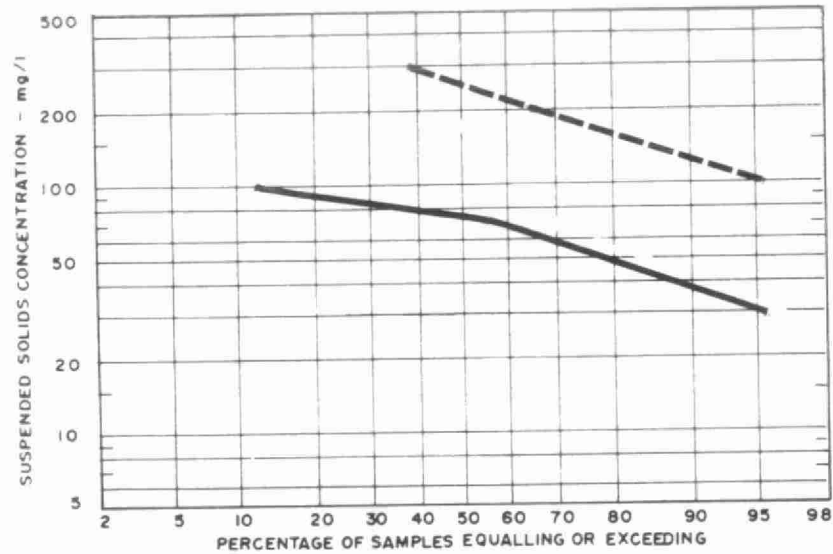
PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10 ³ pounds	mg/l	mg/l	%	10 ³ pounds	mg/l P	mg/l P
JAN	Est. 13.02	Est. .42	-	180	63	65	15.2	105	65	38	5.2	7.0	4.0
FEB	Est. 11.76	.42	-	293	145	51	17.5	235	80	66	18.3	5.3	5.2
MAR	Est. 15.19	.49	-	280	50	82	35.0	350	40	89	47.1	7.0	1.5
APR	Est. 14.06	.47	-	220	47	79	24.4	268	40	85	32.1	3.4	3.3
MAY	Est. 13.02	.42	-	170	75	56	12.4	350	75	79	26.1	3.4	5.0
JUNE	Est. 12.67	.42	-	280	53	81	29.5	345	60	83	37.1	6.1	4.3
JULY	Est. 13.00	.42	-	130	82	37	6.2	207	80	61	16.5	4.6	3.8
AUG	Est. 13.20	.42	-	80	46	43	4.5	180	70	61	14.5	1.4	2.0
SEPT	Est. 12.90	.43	-	230	60	74	21.9	295	60	80	30.3	6.3	4.4
OCT	Est. 13.64	.44	.63	182	49	73	18.1	220	95	57	17.0	5.2	5.3
NOV	13.44	.45	.52	113	73	35	5.3	280	85	70	26.1	3.7	5.0
DEC	13.33	.43	.50	245	83	66	21.5	470	78	83	52.1	2.5	4.4
TOTAL	159.23	-	-	-	-	-	205.4	-	-	-	316.8	-	-
AVG.	13.27	.44	MAXIMUM .63	200	71	65	17.1	270	71	74	26.4	4.8	4.2
No. of Samples	-	-	-	22	22	-	-	22	22	-	-	22	22

BIOCHEMICAL OXYGEN DEMAND



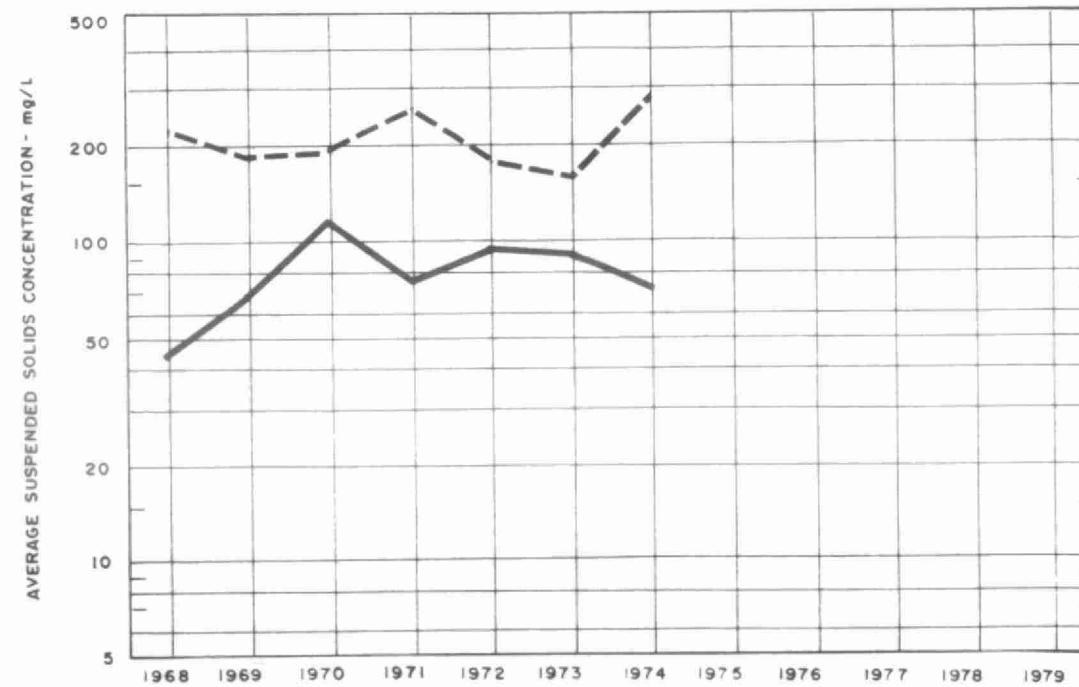
SUSPENDED SOLIDS



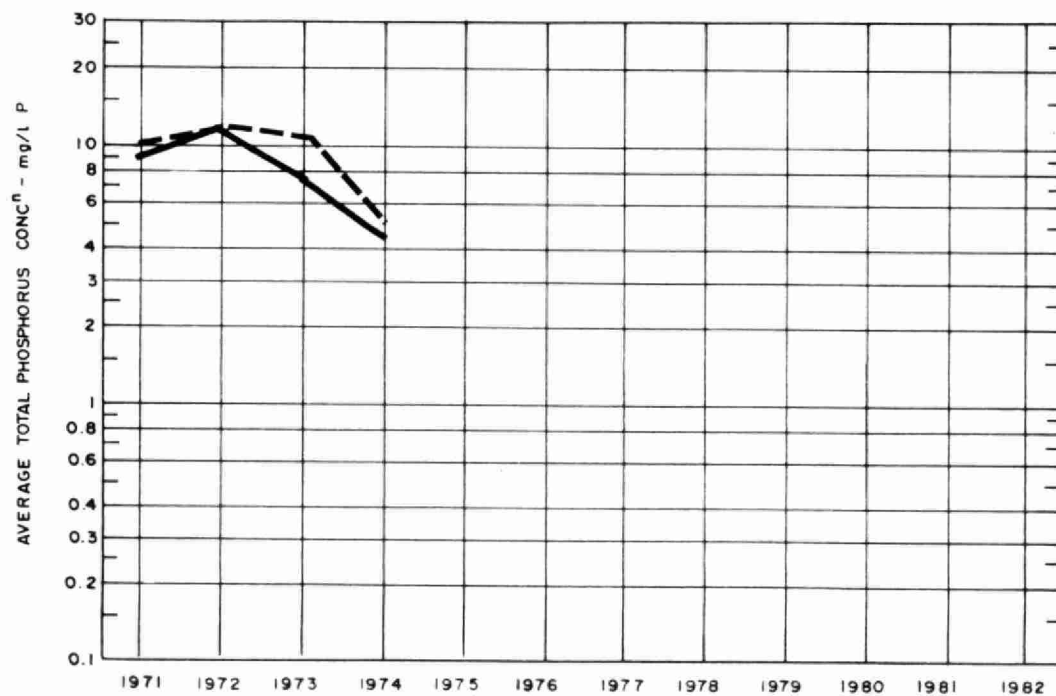
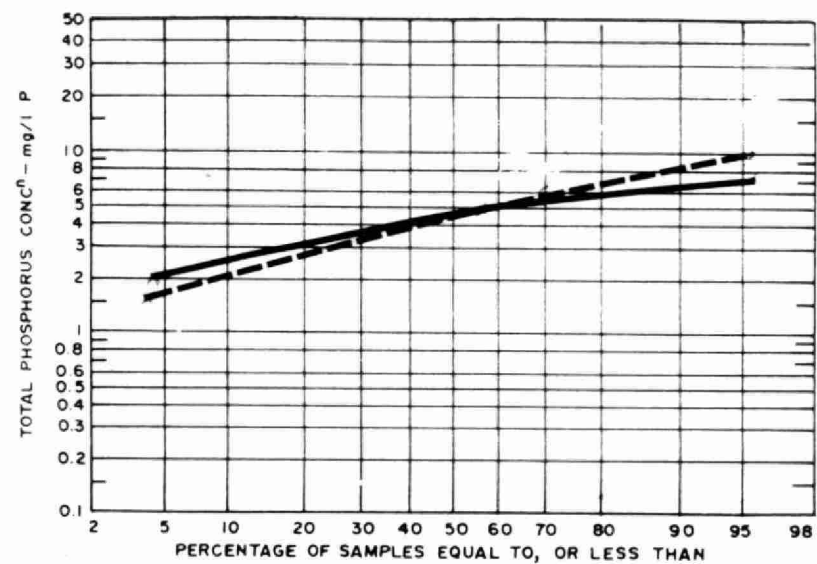
PLANT INFLUENT

PLANT EFFLUENT

—————



PHOSPHORUS



PLANT INFLUENT - - - - -

PLANT EFFLUENT —————

TREATMENT DATA

MONTH	GRIT	CHLORINATION		SLUDGE DIGESTION and DISPOSAL							
	QUANTITY REMOVED cubic feet	CHLORINE USED 10 ³ pounds	AVERAGE DOSAGE mg/l	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT	SLUDGE HAULED cubic yards
				QUANTITY 10 ³ gallons	TOTAL SOLIDS %	VOLATILE SOLIDS %	QUANTITY REMOVED 10 ³ gallons	TOTAL SOLIDS %	VOLATILE SOLIDS %	TOTAL SOLIDS %	
JAN	8	-	-	88	1.3	83	-	1.5	70	.1	-
FEB	6	-	-	58	1.8	82	-	3.0	59	.1	-
MAR	17	-	-	62	2.1	87	-	4.6	72	.1	-
APR	34	-	-	62	2.2	65	136	2.2	65	.2	810
MAY	23	-	-	65	1.5	71	240	-	-	-	1426
JUNE	26	-	-	60	1.5	79	-	5.7	60	-	-
JULY	31	-	-	64	1.8	76	-	4.5	67	.1	-
AUG	30	-	-	64	2.6	84	-	5.0	76	.1	-
SEPT	32	-	-	60	4.1	80	-	7.3	56	.1	-
OCT	33	-	-	64	2.0	82	-	4.6	64	.1	-
NOV	27	-	-	60	3.2	73	-	4.4	66	.1	-
DEC	17	-	-	81	2.4	81	-	4.6	68	.1	-
TOTAL	284	-	-	788	-	-	376	-	-	-	2236
AVG.	1.8 cubic feet/mil gal	-	-	66	2.2	79	-	4.3	66	.1	-

WATER SUPPLY SYSTEM

DESIGN DATA

PROJECT Village of Espanola WSS

PROJECT NO. 6-0072-61

TREATMENT Chlorination and
Fluoridation

DESIGN FLOW 1 mgd

INTAKE

225 ft. of 18" dia. corrugated metal
pipe

SCREENS

Two 3'9" x 2'4 3/4"
3/8" mesh

WET WELL

7'6" x 22" x 4' min. wl
Capacity at min. wl 4100 imp. gal.

PUMPS

Type: 3 Worthington centrifugal
each 600 US gpm

DIESEL

(Standby) Continental Red Seal - F226

CHLORINATOR

Type: Wallace & Tiernan A-831
Capacity: 50 lb./day

Standby Chlorinator: Wallace & Tiernan
Capacity: 50 lb./day

FLUORIDE FEEDER

Type: Wallace & Tiernan Series A-690

ELEVATED TANK:

Capacity: 200,000 gallons

'74 Review

GENERAL

The project consists of a water intake in Lake Apsey, a pumping station equipped with three 500 gpm vertical turbine pumps, and a forcemain to a 166,000 gallon capacity standpipe. Treatment at the pumping station consists of chlorination and fluoridation.

The telemetering line at the standpipe was vandalized in March and part of the line had to be replaced. This put the flowmeter out of operation for a short time.

A power failure during the night of August 22 resulted in the stoppage of the pumps and a serious pressure drop in the distribution system for a short period of time. There has been no alarm system for a couple of years and it was hoped that the project could be operated without one but it is apparent that one will be necessary. A new alarm system will be installed in 1975 to record low water levels in the standpipe which will provide ample warning of an impending low pressure problem in the distribution system. There were no other major low pressure problems in the distribution system during the year.

OPERATING COSTS

The total operating cost for the water supply project was \$23,659.00 which represents an increase of 28% over the previous year.

The average cost per thousand gallons of water treated was 12.5 cents which is 3.5 cents higher than the cost in the previous year.

The only Reserve fund expenditure authorized during the year was to provide \$200 to cover half the cost of a snowblower. The balance in the fund as of December 31, 1974 was \$22,302.25.

PROCESS

The total volume of treated water supplied to the community during the year was 188.59 million gallons which represents an average daily consumption of 520 thousand gallons.

The average fluoride concentration in the treated water was 0.9 mg/l based on 361 samples. The total amount of sodium silicofluoride required for the year was 3159 pounds.

The average chlorine dosage for the year was 1.7 mg/l requiring 3229 pounds of chlorine. The average residual in the treated water was 0.8 mg/l.

BACTERIOLOGICAL QUALITY

A total of 36 samples of treated water was taken at the plant and of these only one contained coliform organisms and it may have been contaminated during sampling. Seven of 138 samples collected from the distribution system indicated the presence of coliform organisms. All seven were collected at a particular dead end line. A hydrant has since been installed at the end of this line and it is being periodically flushed.

CHEMICAL QUALITY

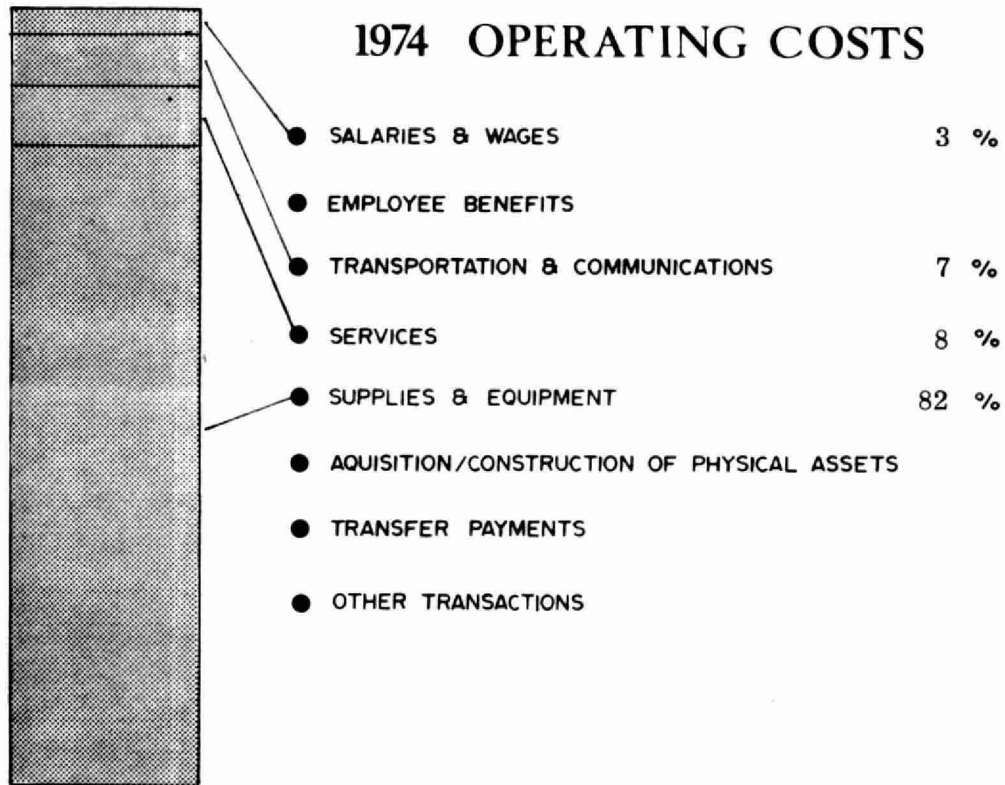
The average treated water concentrations of iron at 0.11 mg/l, chloride at 7 mg/l and the pH of 7.3 were within Ministry standards. The average turbidity of 1.2 JTU and colour of less than 11 apparent units were satisfactory for an unfiltered water supply.

CONCLUSIONS

The general operation of the plant was satisfactory and the plant supplied a good quality water to the community most of the time.

There was only one major interruption in service due to a power failure in August. An alarm system will be installed in the spring of 1975 which will provide sufficient warning of an impending pressure problem in the distribution system.

ANNUAL COSTS



YEARLY OPERATING COSTS

YEAR	WATER TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS
			cents per 1000 gal
1972	175 *	\$15,002	9
1973	208	18,502	9
1974	189	10,982	6

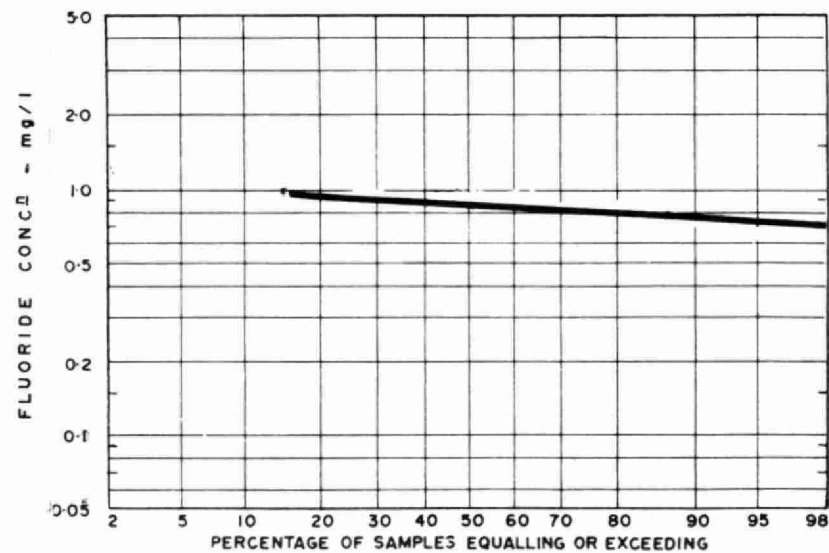
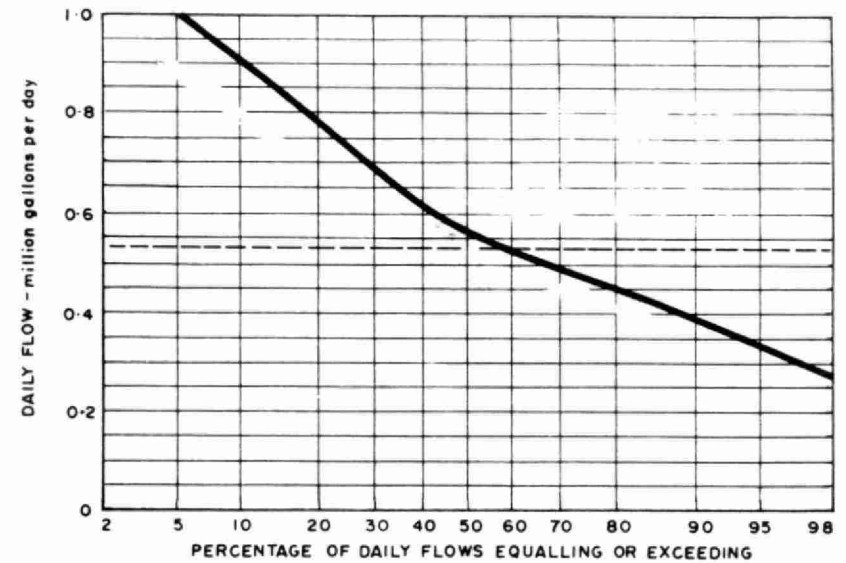
* Estimated

OPERATING EXPENDITURES

Regular Staff	\$		\$	
Casual (Unclassified) Staff		283		
TOTAL SALARIES AND WAGES				283
TOTAL EMPLOYEE BENEFITS				
TOTAL TRANSPORTATION AND COMMUNICATIONS				729
Insurance		199		
Sludge Haulage				
Repairs and Maintenance		717		
Other Services		3		
TOTAL SERVICES				919
Machinery and Equipment		199		
Chemicals		2288		
Utilities		4701		
Other Supplies and Equipment		1863		
TOTAL SUPPLIES AND EQUIPMENT				9051
TOTAL AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS				
TOTAL TRANSFER PAYMENTS				
OTHER TRANSACTIONS				
GRAND TOTAL	GRAND TOTAL		\$	10982

PROCESS DATA FLOWS

DESIGN CAPACITY 0.533 MGD



FLUORIDE
(treated water)

PLANT PERFORMANCE

MONTH	FLOWS				CHEMICALS USED		TREATED WATER					
	TOTAL PLANT OUTPUT million gallons	AVERAGE DAILY FLOW million gallons	MAXIMUM DAY'S FLOW million gallons	MAXIMUM RATE mgd	Na ₂ SiF ₆		TURBIDITY		COLOUR		TEMPERATURE	
					AMOUNT USED pounds	DOSE mg/l	AVERAGE FTU	MAXIMUM FTU	AVERAGE App. units	MAXIMUM App. units	AVERAGE ° F	MAXIMUM ° F
JAN	13.18	.42	.46		232	1.1	.6	.6	<5	5		
FEB	12.28	.44	.48		203	1.0	.6	.6	<5	<5		
MAR	13.42	.43	.48		230	1.0	.5	.5	<5	<5		
APR	12.47	.42	.55		216	1.0	1.0	1.3	13	15		
MAY	15.57	.50	.79		244	.9	1.0	1.0	20	20		
JUNE	19.20	.64	.97		294	.9	2.3	2.6	15	15		
JULY	25.15	.81			405	1.0	1.7	1.9	18	20		
AUG	26.97	.87	1.26		470	1.0	1.6	1.6	15	15		
SEPT	13.82	.46	.70		275	1.2	1.7	1.9	1.8	20		
OCT	12.94	.42	.48		252	1.2	1.2	1.4	10	15		
NOV	11.35	.38	.42		169	1.2	.9	.9	10	10		
DEC	12.24	.40	.46		169	1.2	2.9	2.9	15	15		
TOTAL	188.59				3159							
AVG.	15.72	.52	1.26		263	1.1	1.2	2.9	<11	20		

CHLORINATION and DISINFECTION

MONTH	RAW WATER					PLANT EFFLUENT		DISTRIBUTION SYSTEM		CHLORINATION			
	NUMBER OF SAMPLES HAVING TOTAL COLIFORM ORGANISMS PER 100 ml OF					NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	TOTAL AMOUNT OF CHLORINE USED pounds	DOSAGE		RESIDUAL IN PLANT EFFLUENT mg/l
											PRE - mg/l	POST - mg/l	
	0	1 - 3	4 - 32	33 - 320	> 320								
JAN	2					2		10		210	1.6		.6
FEB	1					1		6		195	1.6		.5
MAR	1					3		10		232	1.8		.8
APR				1		2		7		218	1.7		.9
MAY				1		3		10		248	1.6		.9
JUNE					1	3		10		299	1.6		1.0
JULY	2					1		9		403	1.6		1.0
AUG	2					4		14	2	427	1.6		.9
SEPT		2	1			5	1	18	4	263	1.9		.9
OCT	2	1		1		4		17	1	251	1.9		.6
NOV		1		1		4		15		229	2.0		.6
DEC	2	1				3		12		254	2.0		.6
TOTAL	12	5	1	4	1	35	1	138	7	3229			
AVG.	3 (NOTE - Average shown is the GEOMETRIC MEAN)									9 pounds per day	1.7		.8

WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	
HARDNESS in mg/l as CaCO_3	22	33	56	4	22	33	48	26	80 - 100
ALKALINITY in mg/l as CaCO_3	22	20	28	7	22	19	25	2	30 - 100
IRON in mg/l Fe	22	.09	.35	.03	22	.11	.35	.03	Less than 0.3
CHLORIDE in mg/l Cl^-	22	8	40	1	22	7	11	5	Less than 250
pH in pH units	22	7.6	8.2	6.6	22	7.3	7.9	6.6	7.0 - 8.5
FLUORIDE in mg/l F^-	20	.16	.8	.05	361	.9	1.1	.1	Less than 1.2

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